

REMARKS

Applicants respectfully request the Examiner to reconsider the present application in view of the foregoing amendments to the claims and the following remarks.

Status of the Claims

Claims 1, 3-11, 13-20 and 22-24 are pending. Claims 2, 12 and 21 have been canceled.

The claims have been amended:

(I) To specify the structure of the continuous phase and the dispersed phase with an islands-in-an ocean structure in claims 1 and 16 (based on claim 21),

(II) To specify "the vulcanization-activating agent" in claims 1 and 16 as "at least one member selected from the group consisting of an organic compound having at least two polymerizable unsaturated bonds per molecule, and a maleimide-series compound" (based on claim 12), and

(III) To specify with "the crosslinkable group-containing resin" with "a thermoplastic resin having an unsaturated bond which comprises at least one member selected from the group consisting of a polyamide-series resin, a polyester-series resin, a polyoxyalkylene-series resin, a polythioether-series resin, a polycarbonate-series resin, a polyimide-series resin, a polysulfone-series resin, a polyurethane-series resin, a polyolefin-series resin, a halogen-containing resin, a styrenic resin, a (meth)acrylic resin, and a thermoplastic elastomer" (based on claims 2 and 5, and page 39 lines 12-16).

It is noted that a polyphenylene ether-series resin is not recited in the claims as one of the thermoplastic resin of the crosslinkable group-containing resin in the (III) in order to clarify the differences between the present invention and Teruo, as will be discussed further below.

No new matter has been added by way of the above amendments.

Based upon the above considerations, entry of the present amendment is respectfully requested.

In view of the following remarks, Applicants respectfully request that the Examiner withdraw all rejections and allow the currently pending claims.

Rejection Under 35 USC § 102

Claims 1-5 and 7-24 are rejected under 35 USC § 102(b) as being anticipated by EP 0 170 701 A1 (hereinafter "Johnson"). Applicants respectfully traverse. Reconsideration and withdrawal of this rejection is respectfully requested.

Rejection Under 35 USC § 103

Claims 6 and 14-24 are rejected under 35 USC § 103(a) as being unpatentable over Johnson in view of Japan Abstract of Japanese Application Publication No. JP 04-008054 (hereinafter "Teruo"). Applicants respectfully traverse. Reconsideration and withdrawal of this rejection is respectfully requested.

Arguments

Johnson

Johnson discloses the following invention.

"1. A thermoplastic composition blend having a ground vulcanized rubber component, characterized in that the blend includes from 1-90 parts by weight of the ground vulcanized rubber in the form of small dispersed particles essentially of 1.5 mm number average or below, wherein said rubber is selected from the group consisting of natural rubber, synthetic polymer or copolymer rubber derived from alkadienes, or mixtures thereof, and correspondingly, 90-1 parts by weight of polyolefin resin and at least 0.5 parts by weight of one or more functionalized olefin polymers per 100 parts by weight of polyolefin resin wherein said functionalized olefin polymer is a copolymer of at least one olefin and at least one ethylenically unsaturated organic monomer; wherein said organic monomer is selected from the group consisting of unsaturated mono or dicarboxylic acids having from 3 to 20 carbon atoms; acid anhydride, maleamic acid, acid halide, ester and metal salt derivatives of said unsaturated mono or dicarboxylic acids; vinyl esters of saturated carboxylic acids wherein the acid constituent of said saturated carboxylic acid has from 2 to 18 carbon atoms; vinyl alkyl ethers wherein said alkyl constituent has from 1 to 18 carbon atoms; vinyl halides; vinylidene halides; acrylonitrile; methacrylonitrile; and styrene.

The composition of claim 1, wherein is incorporated 0-300 parts by weight percent based on the composition of one or more additives, selected from the group consisting of carbon black, clay, silica, alumina, calcium carbonate, titanium dioxide, pigments, flame retardants, antioxidants, antidegradents, tackifiers, reinforcing materials, processing aids and plasticizers.

A process for manufacturing a thermoplastic compositions which comprises mixing a blend of about 1-90 parts by weight of ground vulcanized rubber in the form of small dispersed particles essentially of 1.5 mm number average or below, wherein said rubber is selected from the group consisting of natural rubber, synthetic polymer or copolymer rubber derived from

alkadienes, or mixtures thereof, and correspondingly, 90-1 parts by weight of polyolefin resin and at least 0.5 parts by weight of one or more functionalized olefin polymers per 100 parts by weight of polyolefin resin at a temperature high enough to soften or melt the polymers, and for sufficient time to obtain a homogeneous mixture wherein said functionalized olefin polymer is a copolymer of at least one olefin and at least one ethylenically unsaturated organic monomer; wherein said organic monomer is selected from the group consisting of unsaturated mono or dicarboxylic acids having from 3 to 20 carbon atoms; acid anhydride, maleamic acid, acid halide, ester and metal salt derivatives of said unsaturated mono or dicarboxylic acids; vinyl esters of saturated carboxylic acids wherein the acid constituent of said saturated carboxylic acid has from 2 to 18 carbon atoms; vinyl alkyl ethers wherein said alkyl constituent has from 1 to 18 carbon atoms; vinyl halides; vinylidene halides; acrylonitrile; methacrylonitrile; and styrene.”

Teruo

Teruo discloses “A polyphenylene ether-series resin composition comprising (a) a polyphenylene ether resin having an unsaturated group, (b) triallyl isocyanurate and/or triallyl cyanurate” and (c) a styrenic thermoplastic resin and/or a polybutadiene resin (claim 1).

Comparison of the present invention and the cited references

Claim 1 (and the dependent claims)

Johnson fails to disclose or suggest not only the specific resin containing the specific vulcanization-activating agent or the specific thermoplastic resin having an unsaturated bond as

the crosslinkable group-containing resin, but also fails to disclose an island-in-an ocean structure in a dispersed phase being directly bonded to the continuous phase and comprising a vulcanized rubber.

Although Johnson discloses various additives (functionalized olefin polymers and the like), such additives are not encompassed by the specifically claimed vulcanization-activating agent such as the organic compound having at least two polymerizable unsaturated bonds. Moreover, there is no suggestion in Johnson to introduce the vulcanization-activating agent to the polyolefin resin (before mixing the resin with the vulcanized rubber). In addition, since the vulcanization-activating agent is usually used as an additive for activating vulcanization of a rubber, there is no suggestion of adding the vulcanization-activating agent to the resin. Moreover, the polyolefin resin of Johnson has no unsaturated bond.

Further, according to Johnson, the polyolefin resin does not directly bond to the vulcanized rubber since the polyolefin resin and the vulcanized rubber bond on contact with the functionalized olefin polymers. That is, the functionalized olefin polymers act as a compatibilizer between the resin and the rubber in Johnson.

In addition, since Johnson uses the vulcanized rubber with the aim of molding without a curing process (see page 2, lines 40-44), there is no motivation to combine Johnson with Teruo which requires the use of a polyphenylene ether resin having an unsaturated group (differing from Johnson which uses the resin not having an unsaturated group) for curing the resin composition.

Further, there is no suggestion in Teruo to introduce the specific vulcanization-activating agent to the polyphenylene ether resin (before mixing the resin with the (c)). The polyphenylene ether resin disclosed by Teruo does not corresponds to the specific crosslinkable group-containing resin in the present invention.

Therefore, even if Johnson is combined with Teruo, the present invention is not taught, suggested or rendered obvious.

Claim 16 (and the dependent claims)

Johnson fails to disclose or suggest the specific combinations (a) to (d) of the specific resin and the specific rubber. Johnson is also silent regarding the claimed island-in-an ocean structure in a dispersed phase being directly bonded to the continuous phase and comprising a vulcanized rubber.

That is, as mentioned, the polyolefin resin does not directly bond to the vulcanized rubber in Johnson.

Moreover, various additives such as the functionalized olefin polymers do not correspond to the specific vulcanization-activating agent in the combination (a). Further, regarding the combination (b) to (d), Johnson does not disclose any of a polyamide-series resin, a silicone-series unvulcanized rubber and a polyalkenylene.

In addition, as mentioned, there is no motivation to combine Johnson with Teruo.

Unexpected advantages

According to the present invention, unexpected advantages are obtained. That is, according to Johnson, the polyolefin resin cannot be directly bonded to the vulcanized rubber as mentioned. Therefore, it is difficult to impart various characteristics of the resin and the rubber to the thermoplastic composition blend in Johnson. Further, the resin is limited to only the polyolefin resin.

In Teruo, there are specific limitations not only on the kinds of the resin but also the kinds rubber that can be used.

On the other hand, according to the present invention, since the specific resin is combined with the rubber, a crosslinking reaction on the interface between the rubber and the resin is successfully conducted. Thus, direct and firm bond between the resin and the rubber is realized for a variety of combinations of resins and rubbers without a compatibilizer such as Johnson.

In summary, the specific invention defined by the currently amended claims is not suggested by the references. Accordingly, it is submitted that there is no prima facie case of obviousness as to the current claims. Even if there was a prima facie case of obviousness, it is submitted that the above-discussed results are truly unexpected and thus rebut any prima facie case of obviousness. Accordingly, it submitted that the present application is now in condition for allowance.

Conclusion

A full and complete response has been made to all issues as cited in the Office Action. Applicants have taken substantial steps in efforts to advance prosecution of the present application. Thus, Applicants respectfully request that a timely Notice of Allowance issue for the present case.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Raymond C. Stewart (Reg. No. 21,066) at the telephone number below to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.147; particularly, extension of time fees.

Dated: July 22, 2008

Respectfully submitted,

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